



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 29 1993

GPP OFFICIAL RECORD
HEALTH EFFECTS DIVISION
SCIENTIFIC DATA REVIEWS
EPA SERIES 361

MEMORANDUM

SUBJECT: Exposure Assessment for Glufosinate Ammonium.

FROM: Charles Lewis *Charles Lewis*
Special Review and Registration Section II
Occupational and Residential Exposure Branch
Health Effects Division (H7509C)

TO: Joanne Miller, PM 23
Herbicide/Fungicide Branch
Registration Division (H7505C)

THRU: Mark I. Dow, Ph.D., Section Head *Mark I. Dow*
Special Review and Registration Section II
Occupational and Residential Exposure Branch
Health Effects Division (H7509C)

Larry C. Dorsey, Chief *Larry C. Dorsey*
Occupational and Residential Exposure Branch
Health Effects Division (H7509C)

The Occupational and Residential Exposure Branch (OREB) has been requested by the Registration Division (RD) to provide an exposure assessment for the proposed use of glufosinate ammonium on apples, grapes, tree nuts, residential outdoor locations and non-crop areas. The assessment is attached.

DP Barcode: D184160

Pesticide Chemical Code: 128850

EPA Req. No.: 8340-UE, UA, UT, UI

PHED: Yes. Run # 20, Version 1.01

I. INTRODUCTION:

A. Background:

Glufosinate ammonium is the common name for ammonium-DL-homoalanine-4-yl-(methyl) phosphinate. The products to be considered are: Ignite® 1SC Herbicide, 11.33% ai (EPA Reg. No. 8340-UE); Shield® Grass and Weed Killer Ready-To-Use, 1.0% ai (EPA Reg. No. 8340-UT); Arise® Grass And Weed Killer Concentrate, 5.78% ai (EPA Reg. No. 8340-UT); and Sweep® Grass And Weed Killer Super Concentrate, 11.33% ai (EPA Reg. No. 8340-UA). The four products are manufactured by Hoechst Celanese Corporation. Proposed use of Shield®, Arise® and Sweep® is for non-selective weed control of emerged weeds in residential outdoor locations. Ignite® is intended for non-selective weed control of emerged weeds in apples, grapes, tree nuts and non-crop areas.

Additional identifying characteristics of glufosinate ammonium:

Company Name: HOE-39866

Molecular Formula: $C_5H_{15}N_2O_4P$

Molecular Weight: 198.2

The following documents were included with the submission from RD for review:

MRID No. 405010-01. Exposure of Workers to HOE-039866 (Ignite® 1.67 SC Non-Selective Herbicide, Glufosinate Ammonium) Applied by Handheld Hydraulic Sprayguns. Conducted by Orius Associates, Inc., November 30, 1987.

MRID No. 405010-20. Risk Assessment for Workers Exposed to HOE-039886 (Ignite® 1.67 SC Non-Selective Herbicide, Glufosinate Ammonium) Applied by Handheld Hydraulic Sprayguns and Ground Boom Sprayers. Prepared by Orius Associates, Inc., December 11, 1987.

OREB has not previously prepared an exposure assessment for this chemical.

B. Purpose:

OREB has been requested by RD to provide an applicator and bystander exposure assessment for the four proposed products and review the two submissions.

II. DETAILED CONSIDERATIONS:

ORIOUS Exposure Study

MRID No. 405010-01. Exposure of Workers to HOE-039866 (Ignite® 1.67 SC Non-Selective Herbicide, Glufosinate Ammonium) Applied by Handheld Hydraulic Sprayguns. Conducted by Orius Associates, Inc., November 30, 1987.

The study does not meet the guidelines in Subdivision U for the following reasons:

- 1). Protective gloves were utilized during the study. The submitted labels do not require gloves.
- 2). There was no certification of pre-approval by EPA for the protocol and sampling strategy.
- 3). Only one site was utilized.
- 4). Mixer/loader monitoring periods were insufficient to collect measurable residues.
- 5). Only raw data for four mixer/loaders and four applicators were included in the report. Subdivision U Guidelines require 15 replicates.

A number of other inadequacies are listed in the attached complete evaluation.

ORIOUS Risk Assessment

MRID No. 405010-20. Risk Assessment for Workers Exposed to HOE-039866 (Ignite® 1.67 SC Non-Selective Herbicide, Glufosinate Ammonium) Applied by Handheld Hydraulic Sprayguns and Ground Boom Sprayers. Prepared by Orius Associates, Inc., December 11, 1987.

Two risk assessments were prepared by Orius Associates for workers using HOE-39866 (Ignite® 1.67 SC Non-Selective Herbicide). Scenario A. -- Commercial right-of-way (ROW) application with handheld sprayguns wearing long pants and long-sleeve shirt; wearing chemical resistant gloves while mixing/loading and spraying and washing the face and hands with soap and water; and Scenario B. -- Ground boom application wearing long pants and long-sleeve shirt; wearing chemical resistant gloves while mixing/loading and washing the face and hands with soap and water. Two different surrogates were used to estimate ground boom exposure.

Scenario A (calculations by ORIOUS). "The geometric mean rate of exposure was 0.0727 mg/lb ai handled. At an application rate of 1.5 lb ai/acre and treatment of 1 mile at a swath width of 20 ft, exposure would be 0.003776 mg/kg bw/day."

Scenario B (calculations by ORIOUS). "The rate of exposure for the mixer/loader was 0.0109 mg/lb ai handled based on the worker exposure study with Ignite (File/Issue HOE/87105). The rate of exposure for the applicator was estimated from the reductions of exposure by clothing and hygiene from the referenced study with ground boom operators -- SPRAY OPERATOR SAFETY STUDY, 1983, BRITISH AGROCHEMICALS ASSOCIATION LIMITED (BAAL). Whole body unprotected exposure was 0.957 mg/lb ai sprayed. We (ORIOUS) assumed a distribution of 5% to the face, 62% to the hands, and 33% to the body. Washing removed 92% of the residue from the face; 77% of the residue from the hands; and, permeation of the clothing was 1.4%. The calculated rate of exposure for the sprayer was 0.14657 mg/lb ai handled. Total exposure would be the sum of exposures while mixing/loading and while spraying.

At an application rate of 1.5 lb ai/acre, and a treatment of 10 acres (report has 25 acres but the ORIOUS calculations are for 10 acres), exposure would be 0.033728 mg/kg bw/day."

The labels provided with the submission are not for the same products or use patterns as the exposure assessments calculated by ORIOUS. Shield®, Arise® and Sweep® are intended for non-selective weed control of emerged weeds in residential outdoor locations. Shield® is a ready to use product, Arise® and Sweep® are intended for use in handheld pump-up type sprayers. Ignite® 1SC Herbicide is the only product to be used with ground equipment. The product for which the exposure estimates were calculated, Ignite® 1.67 SC Non-Selective Herbicide, was not included among the labels for review.

ORIOUS assumed in both of it's scenarios the use of long pants, long-sleeve shirt, chemical resistant gloves, and washing the face and hands with soap and water. The labels for Shield®, Arise®, Sweep®, and Ignite® 1SC Herbicide do not contain information on personal protective equipment (PPE). Also, the labels do not require washing hands and face after use, only to "Wash thoroughly with soap and water after handling and before eating or smoking". Consequently, the exposure scenarios prepared by ORIOUS are not applicable to the four labels provided by RD.

OREB Exposure Assessment

RD requested that OREB provide exposure assessments for applicators and bystanders for Shield®, Arise®, Sweep®, and Ignite® 1SC Herbicide. OREB attempted to conducted the assessment for Ignite® 1SC Herbicide since exposure should be greatest with this product.

Ignite® 1SC Herbicide is intended for non selective weed control around apples, grapes, tree nuts and non-crop areas. On this label, non-crop areas include: field grown shade trees and shrubs; landscape trimming and maintenance; recreational and public

areas; and farmsteads. Methods of application include ground applied directed sprays, either broadcast or banded, and spot sprays with knapsack sprayers or high volume spraying equipment utilizing handguns or other suitable nozzle arrangements.

OREB used the Pesticide Handlers Exposure Database (PHED) to estimate total exposure. However, according to current Branch policy regarding PHED, sufficient data are lacking for the use scenarios "groundboom application/open cab", "high pressure hand wand" and "backpack sprayer use". For this reason, exposure cannot be estimated for application of Ignite® 1SC Herbicide.

OREB also attempted to use PHED to estimate mixer/loader exposure from Ignite® 1SC Herbicide. Unfortunately, data are lacking to estimate exposure when gloves are not worn.

An estimate of exposure for bystanders was not possible since data are not currently available that would enable OREB to quantify this value.

III. CONCLUSIONS:

OREB was requested by RD to provide an applicator and bystander exposure assessment for Shield®, Arise®, Sweep®, and Ignite® 1SC Herbicide and to review MRID No. 405010-01 and MRID No. 405010-20.

Study Reviews

MRID No. 405010-01. Exposure of Workers to HOE-039866 (Ignite® 1.67 SC Non-Selective Herbicide, Glufosinate Ammonium) Applied by Handheld Hydraulic Sprayguns. Conducted by Orius Associates, Inc., November 30, 1987.

The study does not meet the guidelines requirements in Subdivision U for the following reasons:

- 1). Protective gloves were utilized during the study. The labels provided by RD do not require gloves.
- 2). No certification of pre-approval by EPA for the protocol and sampling strategy were included with the study.
- 3). Only one site was utilized.
- 4). Mixer/loader monitoring periods were insufficient to collect measurable residues.
- 5). Only raw data for four mixer/loaders and four applicators were included in the report. Subdivision U Guidelines require 15 replicates.
- 6). A number of other discrepancies/inadequacies are listed in

the attached evaluation.

MRID No. 405010-20. Risk Assessment for Workers Exposed to HOE-039886 (Ignite® 1.67 SC Non-Selective Herbicide, Glufosinate Ammonium) Applied by Handheld Hydraulic Sprayguns and Ground Boom Sprayers. Prepared by Orius Associates, Inc., December 11, 1987.

The estimates of exposure for Ignite® 1.67 SC Non-Selective Herbicide are based on an exposure study that does not relate to the labels for which RD requested an analysis (Shield®, Arise®, Sweep® and Ignite® 1SC Herbicide) and therefore does not satisfy guideline requirements.

The estimates of exposure calculated for Ignite® 1.67 SC Non-Selective Herbicide by ORIUS Associates, Inc., are as follows:

Mixer/loaders - 33.0 µg/kg bw/day (long pants, long-sleeved shirt, and gloves)

Applicators - 4.0 µg/kg bw/day (long pants, long-sleeved shirt, and gloves)

OREB Estimates of Exposure

Sufficient PHED data are lacking for the use scenarios "groundboom application/open cab", "high pressure hand wand" and "backpack sprayer". Consequently, **applicator** exposure cannot be estimated.

PHED mixer/loader data are lacking when gloves are not worn. OREB cannot estimate **mixer/loader** exposure for any of the products.

No data are available that would enable OREB to estimate exposure to **bystanders** from use of any of the proposed products.

cc: C. Lewis, OREB
Correspondence File
Chemical File (128850)
Circulation



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OCT 15 1985

EXPEDITE

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

Subject: Special Review EBDC
Metiram Data Call In. Product chemistry and request for time extension.
Accession No. None [RCB No. 19]

From: Martha J. Bradley, Chemist *Martha J. Bradley*
Residue Chemistry Branch
Hazard Evaluation Division (TS-769)

Thru: Charles L. Trichilo, Chief
Residue Chemistry Branch
Hazard Evaluation Division (TS-769)

To: H. Jacoby, PM 21
Registration Division (TS-767C)

Susan Lewis, Data Call In
Registration Division (TS-767C)

Toxicology Branch
Hazard Evaluation Division (TS-769)

This EBDC data package was submitted in connection with the NRDC suit. It is being expedited at the request of the HED Deputy Director.

RD is requesting an opinion as to the date the registrants could have reasonably been expected to submit relevant plant residue and metabolism data had studies been initiated in a timely manner.

FMC Corporation is requesting an extension to generate additional residue and metabolism data to support all of the crops currently listed instead of the two crops, apples and potatoes, they originally decided to support.

FMC also claims that metiram does not meet the requirements for determining the octanol/water partition coefficient (63-11). These data are required if the technical grade material is organic and non-polar. FMC claims that metiram is practically insoluble in both water and octanol; has inorganic/polar properties; is unstable in the octanol/water system; and that "attempting to run the study would be a wasteful exercise and is unlikely to yield any meaningful data".

A similar claim was made for maneb and reviewed by R. Loranger in an August 29 1985 memo. Like maneb, metiram is an organometallic complex, neither wholly organic or inorganic. Metiram is practically insoluble in water and in most

organic solvents; soluble with decomposition in pyridine (Martin, H. 1974 Pesticide Manual, E. 4. British Crop Protection Council, Clacks Farm, Barley, Ombersley, Droitwich, Worcester, England). Therefore, like maneb, it is possible that metiram could preferentially partition into octanol versus water. As to the claimed instability of metiram in the octanol/water system, it is the degradation products of metiram that would be available to bioaccumulate (this issue is discussed in the Rohm and Haas product chemistry submission, Accession No. 157953).

Conclusions and Recommendations:

FMC should submit data to substantiate their claims that metiram is "practically insoluble in both water and octanol", is inorganic/polar, and is unstable in the octanol/water system" or conduct an octanol/water partition coefficient study.

The time extension requested involves no scientific issues. RCB has concurred with the RD deadlines for the EBDC data call in with the exception of the residue data for meat, milk, poultry and eggs. RCB recommended June 1986 for the deadline as was discussed in the Task Force meeting held on 10/7/85.

cc: Reviewer, EBDC SF, R F, circu, TOX, PM 21, Susan Lewis, Amy Rispin,
PMSD/ISB
RDI:Section Head:RSQuick:Date:10/11/85
TS-769:RCB:Reviewer:MJBradley:MJB:CM#2:RM:810:557-7377:10/08/85



13544

R132102

Chemical: Glufosinate

PC Code:
128850

HED File Code: 12000 Exposure Reviews

Memo Date: 6/29/1993

File ID: DPD184160

Accession #: 000-00-0108

HED Records Reference Center
8/29/2006

